2008 – 2009 State of Mississippi Technology Infrastructure and Architecture Plan

Published by ITS Mississippi Department of Information Technology Services

TABLE OF CONTENTS

Introduction

Strategic Objectives of the Infrastructure and Architecture Plan

Each year the Mississippi Department of Information Technology Services (ITS) publishes the *State of Mississippi Technology Infrastructure and Architecture Plan* to inform the Governor and the Legislature, the ITS Board, state agencies and institutions, and information technology vendors about plans for infrastructure growth in state government. This plan contains details pertaining to the core domains of the infrastructure and the IT projects planned for each domain.

ITS utilizes research capabilities and vendor relationships to keep pace with infrastructure technologies. These technologies are incorporated into our plan as they become beneficial to the state. ITS monitors changes in the infrastructure requirements and changes in technology through the agency and institution planning process, emerging technology initiatives, and participation in and tracking of infrastructure projects.

To view the *State of Mississippi Technology Infrastructure and Architecture Plan* online, visit the ITS website at www.its.ms.gov and select the Technology Infrastructure and Architecture Plan link.

Scope of the Infrastructure and Architecture Plan

The evolving and expansive growth of data, voice, and video technologies provides a continuous challenge to seamless integration of these services into an enterprise that is customer-centric, scalable, secure, efficient, and effective. ITS' mission is to provide statewide leadership and services that facilitate cost-effective enterprise information technology and telecommunications solutions for agencies and institutions.

ITS' vision is that the Mississippi telecommunications and computing infrastructure will be a network of networks that is totally integrated, facilitating ubiquitous availability of voice, video, and information services to agencies, employees, and citizens in every corner of the state. The network will be a collaboration of the various infrastructure domains, listed within this document, that utilizes communication and computing technologies, web-based computing applications, networking technologies, management tools, strategic planning, and human resources to provide state agencies with the essential tools to execute their missions. Through the consolidation of communication networks and technologies, state government in Mississippi is moving closer to being one cooperative enterprise, built upon a common architecture, rather than a collection of independent agencies.

For the purpose of this plan, the "Statewide Infrastructure" is defined as "those infrastructure domains that together offer, through connectivity, the potential for state entities to communicate with each other using voice, video, and data." It should be noted that some local infrastructure components are not considered a part of the Statewide Infrastructure, but are considered local infrastructure for a particular building, agency, institution, or campus.

Shared Technology Infrastructure Guiding Principles

The shared technology infrastructure principles are the general rules which hold true across the enterprise infrastructure and architecture. The following principles provide rationale for adherence, serve as starting points for difficult evaluations and decisions, and guide the design and selection of technology components.

PRINCIPLE	RATIONALE
IT is an enterprise-wide resource. IT investments will be aligned with the strategic goals of the State of Mississippi through planning and architecture processes.	⇒ Reduce implementation and support costs, through a consistent enterprise-wide approach to IT solutions. ⇒ Consolidate or integrate existing systems and technical infrastructure. ⇒ Provide the IT foundation to support state entities and local governing authorities' business process flexibility.
State IT infrastructure and architecture will support the state's long-term business, strategies and plans.	⇒ Align and optimize IT resources with changing needs of state entities and local governing authorities. Enable the effective implementation of state business strategies. ⇒ Highlight and promote the value of IT to executives and policy makers.
State IT solutions that deliver products and services to stakeholders will leverage the shared technology infrastructure.	⇒ Provide an infrastructure and architecture which will enable the state to: o Respond to agency changes in technology and business requirements. o Increase consistency, sharing, and accessibility of data. o Ensure interoperability by eliminating technology silos.
State IT infrastructure and architecture is adaptive and must evolve to accommodate changes in business and technology.	⇒ Share and re-use IT assets. ⇒ Ensure IT efforts support state business needs. ⇒ Leverage the advantages of new technologies while balancing investments in existing systems.
State IT solutions will be based upon industry standards and proven technologies that leverage the state IT infrastructure and architecture.	⇒ Support and align with statewide initiatives. ⇒ Increase consistency, share ability, and accessibility of data and applications. ⇒ Ensure a stable long term, and viable technology and application environment.
State IT solutions will actively seek opportunities to implement common sets of shared technologies and services.	⇒ Reduce costs by eliminating redundant investments in technology. ⇒ Improve systems management and administration via common infrastructure. ⇒ Increase the state's ability to deliver quality products and services within budget limitations.
State IT infrastructure and architecture will provide a reliable, secure, and highly-available network and technology infrastructure.	⇒ Increase support for funding a functional, secure, and reliable infrastructure. ⇒ Support the high-availability required for state and local governing authority missions. ⇒ Improve delivery, efficiency, and accessibility of government services to the public.

Funding the Technology Infrastructure

A variety of methods are used to generate and make funding available for state government technology infrastructure projects. Technical infrastructure on the state government campus is primarily funded through general obligation bonds issued by the state for construction and renovation projects. This method of funding is generally used for infrastructure components that have a useful life of ten or more years. Examples include: fiber optic and copper cable within and between state government buildings; construction, maintenance, and renovation of the State Data Center; and construction of a facility to house technology infrastructure components. The ongoing operation and maintenance expenses associated with this type of infrastructure development are funded through a charge-back to the agencies that use these services and resources.

Two shared infrastructure components that require periodic upgrades are 1) the state's mainframe computer system, open systems, and related software and 2) the primary voice communications switch and its ancillary components. Usage rate structures are designed to generate the necessary funding for these upgrades. The statewide broadband network and aggregate Internet access are also funded through usage rates. The costs associated with the anticipated growth of these shared resources are included in the annual billing to the state entities and local governing authorities that use them.

Occasionally, state entities and local governing authorities include funding in their projects and initiatives that expand or enhance the state's technology infrastructure. Generally, however, this funding is focused on supporting the infrastructure of just those specific projects and initiatives. This funding method, therefore, is not always consistent with the overall standards and planned technical directions of the state as a whole.

Each of the methods described above is used in one way or another to fund technology infrastructure development for state government. There are times when circumstances and priorities require a combination of these funding methods to support needed projects. Additionally, with each infrastructure project, regardless of the funding method, opportunities to leverage federal grants and funding programs, such as E-Rate, are maximized to the fullest.

Universal Service

The Communications Act of 1934 stated that all people in the United States should have access to "rapid, efficient, nationwide communications service with adequate facilities at reasonable charges". In the Telecommunications Act of 1996, Congress further refined this goal, decreeing that it is federal policy to provide support for services "essential to education, public health, or public safety", and that all people regardless of location or income level, should continue to have affordable access to telecommunications and information services. This concept, as defined here, has come to be known as "universal service".

The support mechanisms necessary to achieve universal service are administered

by the Universal Service Administrative Company (USAC, www.usac.org), an independent not-for-profit organization regulated by the Federal Communications Commission (FCC, www.fcc.gov). USAC provides universal service support through these four programs:

1. **High Cost**

   This program supports telephone companies that serve high cost areas.

2. **Low Income**

   This program assists low-income customers by helping to pay for monthly telephone charges as well as connection charges.

3. **Rural Health Care**

   This program allows rural health care providers to pay rates for telecommunications services similar to those of their urban counterparts.

4. **Schools and Libraries**

   The Schools and Libraries Program, popularly known as the "E-Rate", provides discounted Internet access, internal connections, and telecommunications services to schools and libraries.

Schools and Libraries (E-Rate)

The Schools and Libraries Program (www.universalservice.org/sl) was established by Congress to help make advanced telecommunications affordable for the nation's K-12 schools and libraries. It provides discounts ranging from 20% to 90% on the costs of eligible telecommunications services, Internet access, and internal connections. The highest discounts go to the schools and libraries serving the most disadvantaged populations, where over 50 percent of the students in the district qualify for the National School Lunch Program.

In the first nine years of the E-Rate program, schools and libraries nationwide have received over $21.7 billion dollars. Mississippi schools and libraries have received $352.5 million dollars of that amount. For eligible schools and libraries, these dollars have been realized in the form of discounts on telecommunications services, Internet access, and internal connections, as well as discounts for services procured on their behalf. These dollar amounts reflect the committed funds, not the actual dollars spent.

ITS fills several roles related to E-Rate.

- **Applicant**—ITS applies for E-Rate discounts on Internet access and on the Statewide Frame Relay/ATM Backbone Network. ITS provides Internet access to schools, libraries, and state agencies. Access to the Internet is gained through connectivity to the statewide backbone.

  For Funding Year 2007 (July 1, 2007 through June 30, 2008), schools and libraries utilized 63% of this backbone. The statewide discount is derived from the simple average of all school districts and libraries in the state which is 83%. Therefore, ITS is able to apply for a 52% discount on Internet access and the Statewide Backbone Network.

- **Master Contracts**—ITS posts Form 470s and issues Request for Proposals (RFPs) to establish E-Rate eligible master contracts from which schools and libraries can receive E-Rate eligible services. Examples of these

services are, LAN Server Express Products List (EPL), Video EPL, MPLS/Frame Relay/ATM Circuits, Routers, Local Telephone Service, and in-state/out-of-state long distance.

- ★ **State Level Coordination**—ITS works very closely with the Department of Education, the Library Commission, and service providers to assist all applicants in the E-Rate process. Through this close working relationship involving all three state agencies, the State of Mississippi has achieved a 100% participation rate of school districts, and a 99% participation rate of public libraries, in the E-Rate program.
- ★ **National Responsibility**—Through affiliations with the National Association of State Telecommunications Directors (NASTD), Telecommunications and Technology Professionals Serving State Government, and with the State E-Rate Coordinators Alliance (SECA), ITS is involved at the national level in efforts to continually improve the program. ITS often participates in FCC, the Schools and Libraries Division (SLD) of USAC, and Congressional hearings that deal with issues related to the program. The ITS E-Rate Coordinator chairs the SECA group which is made up of forty-one states and eighty-nine members. ITS, through these affiliations, participates in monthly conference calls, with representatives from SLD, FCC, National Exchange Carrier Association (NECA), USAC, and members of SECA.

The following is a recap of the first nine years of the E-Rate program. The table below represents the actual discounts committed to the State of Mississippi applicants during the years depicted.

E-Rate Funding Year	Discount
1998	$ 24,347,085
1999	$ 32,867,163
2000	$ 29,951,288
2001	$ 34,769,964
2002	$ 33,760,747
2003	$ 38,495,195
2004	$ 43,529,118
2005	$ 41,086,055
2006	$37,496,359
2007	$36,233,126
Total	**$352,536,100**

The Effect of E-Rate on Mississippi's Frame Relay/ATM Backbone Network

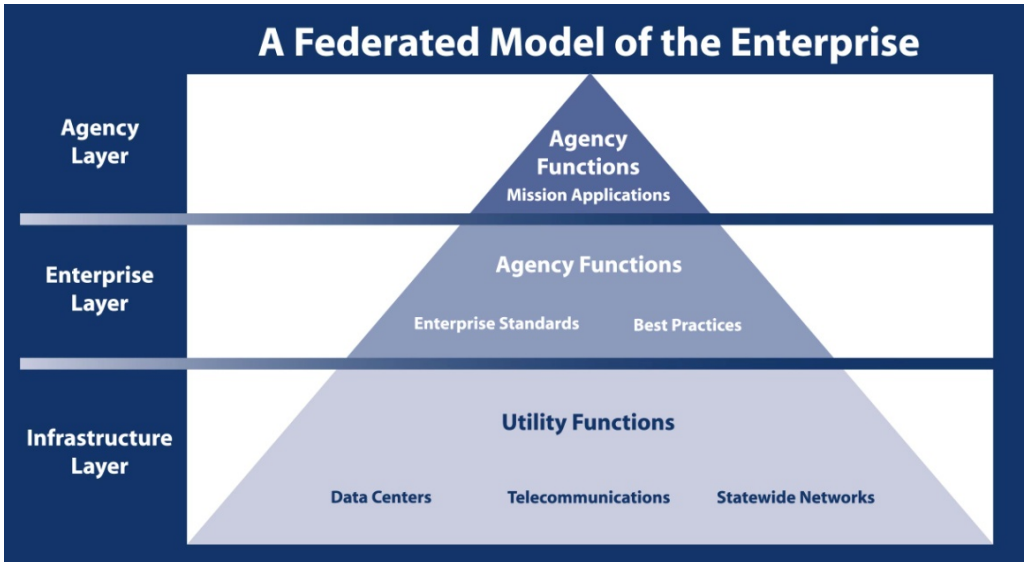
All participants of the Statewide Frame Relay/ATM Backbone Network benefit from ITS' participation in E-Rate, even though, primarily, the intended beneficiaries of E-Rate discounted services are schools and libraries. From July 1, 2007, through June 30, 2008, the combined estimated cost for Internet access and backbone circuits was $3,716,600. This was the cost of providing Internet access and backbone services to all of the universities, community and junior colleges, state agencies, K-12 schools, and public libraries in the State of Mississippi.

Without E-Rate, the $3.7 million in Internet access and backbone circuit services provided in this twelve month period would be billed back to those state entities utilizing the services, since ITS is a cost recovery agency. Due to the E-Rate discounts that ITS is eligible to receive, that $3.7 million cost is reduced by $1.9 million giving the state a reduced actual cost of $2.3 million. The $2.3 million then becomes the amount billed to the utilizing state entities.

With this $1.9 million in E-Rate discounts, ITS has been able to reduce the cost of Internet access and backbone services and has been able to build an even more efficient and robust network with greater bandwidth to better serve our customers' rapidly growing needs. An additional benefit is that through broadband deployment to all schools and libraries in the state, the same broadband technology becomes available to all citizens of the state.

Shared Technology Infrastructure

A shared technology infrastructure is the basis for a federated model of governance. A federated model is made up of three layers that build upon one another to support state government missions.



As part of the state's infrastructure layer, functions needed by many agencies that are not specific to individual environments, such as data center operations, are

managed as a part of a shared technology infrastructure. This is similar to utility services – it is not appropriate for each agency to design and build a custom telephone system when fully featured and interoperable systems are available. These services must be highly reliable, cost effective, and serve as the foundation for agency mission applications.

The enterprise layer consists of the standards that ensure interoperability and consistent best practices across state government. This common set of policies, standards, and guidelines will form a responsive and flexible architecture. This layer represents an area of shared responsibility among state agencies.

The agency layer ("agency" in this model encompasses state entities and governing authorities) is composed of functions that are directly and uniquely aligned with the execution of each agency's mission. Each agency retains the flexibility to focus on innovation that directly advances its mission while building on the established infrastructure of the state. As agencies innovate independently, a statewide return on investment model and quality assurance reviews provide consistent methods to allow independent projects to be compared and prioritized.

This federated model ensures a flexible approach that can distinguish between strategic projects that are directly tied to individual agency missions and shared technology infrastructure that should be managed at a statewide level for the benefit of all agency missions. Mississippi state government can leverage the value of its technology investments in three different areas:

This federated model ensures a flexible approach that can distinguish between strategic projects that are directly tied to individual agency missions and shared technology infrastructure that should be managed at a statewide level for the benefit of all state government missions.

- **Increased Cost Effectiveness** – The state can spread the cost of service over multiple agencies, fully leveraging the state's purchasing power. Bringing these efficiencies to bear allows more agencies the ability to make use of the service, further expanding the economies of scale. Properly implemented, a shared technology infrastructure encourages collaboration, reuse of intellectual capital, and better long term cost models.
- **Improved Service Delivery** – Administrators of a shared infrastructure will develop deeper skills and, therefore, provide better and frequently lower cost service to all end users. Agencies unable to dedicate employees to critical functions, such as network and data security, will have improved and consistent access to resources.
- **Focus on Core Missions** – When directors and technologists are relieved of some of the burden of managing tactical IT issues, their agencies are in a better position to assess and act on those technologies that advance their core missions and directly add value to the lives of the citizens.

State Data Center Construction

ITS is building a structurally hardened, physically secure data center and office building. The State Data Center building will connect to the Capitol Complex via the newly constructed fiber network. The building is projected to be completed in the middle of 2009. It will serve as:

- The state's primary data center
- A hub for telecommunications equipment The new building will provide physical facilities for locating telecommunications equipment to provide redundancy for state networking services

- ★ A business recovery location for other agencies—Other state agencies require State Data Center and office space for disaster recovery equipment and staff in the event of an outage at any state building.

  Even after building the new State Data Center, a need still exists for a co-processing center, and ITS will continue to look for a facility to serve in this capacity. ITS provides disaster recovery for all users of the State Data Center. Mainframe disaster recovery is historically provided on a subscription basis by a disaster recovery vendor, but the subscription rate can be expensive. Open systems can also be provided through subscription services, but the recovery scenarios are more difficult. The trend in the industry is to have a co-processing center which provides a location for redundant servers, storage, and physical facilities. A co-processing center can also support data replication and provide facilities for the relocation of the State Data Center in the event of a disaster at the main facility. In fact, if the co-processing center is equipped adequately, processing can continue with minimal interruption in a disaster recovery condition.

Statewide Initiatives

Mississippi Health Information Infrastructure Task Force

In March 2007, through Executive Order 979, Governor Haley Barbour established the Mississippi Health Information Infrastructure Task Force for the purpose of improving the quality and safety of healthcare delivery by means of the expedited adoption and implementation of Health Information Technology (HIT) and Health Information Exchange (HIE) across the state. The Executive Order directs a twenty member task force to review issues surrounding the creation of a statewide and interstate HIT infrastructure and to present its recommendations to the Governor within two years. The issuance of the Governor's Executive Order has occurred at a pivotal point in both the national progress of health information dissemination and in the context of many local implementations of HIT within Mississippi. Those national and Mississippi based environmental factors were highlighted in *Mississippi Assessment – Health Information Exchange Current Status and Future Potential in Mississippi* issued by the Foundation for E-Health Initiative in September 2006. Subsequent to the issuance of that paper, stakeholders from across Mississippi have worked on related issues through the Health Information Security and Privacy Collaborative (HISPC). Interest in improving healthcare quality, safety, and efficiency is at an all time high, as the state faces the very real challenge of improving the poor quality of healthcare received by the citizens of Mississippi.

The first milestone for the task force was the development of an action plan for Mississippi Health Information Infrastructure, to be delivered within 180 days after formation of the task force. The action plan, published in October of 2007, details recommended activities, staffing requirements, funding options, and milestone dates necessary to achieve the Executive Order goals within the two year time frame. Specifically, in addition to serving on the task force, ITS is also collaborating with members serving on the Technical/Interoperability Work Group.

The proposed charter of this work group includes addressing the IT-related issues associated with implementing HIT and HIE and developing recommendations concerning technology standards and infrastructure and technical operations. Furthermore, in partnership with Information & Quality Healthcare (IQH), ITS has led a cross-functional team in the development of RFP 3560, which seeks proposals for the acquisition of a hybrid system of a clinical data repository/health information exchange for the Mississippi counties of Hancock, Harrison, Jackson, Pearl River, Stone, and George.

Geographic Information Systems (GIS)

State, regional, and local governing authorities in Mississippi use remote sensing and GIS for a wide range of activities, including economic development, natural and physical resource monitoring, tax parcel mapping, infrastructure planning, emergency and disaster preparedness and recovery, and regulatory issues. Today, most of the United States Geological Survey (USGS) maps are over twenty years old. However, to realize the potential benefits from remote sensing and GIS, the state must obtain more up-to-date and accurate data.

The 2003 Mississippi Legislature passed House Bill 861, which created the Mississippi Coordinating Council for Remote Sensing and GIS. This council is responsible for the coordination of remote sensing and GIS activities. This includes the establishment and enforcement of standards that will make it easier for users to share data and facilitate cost-sharing arrangements to reduce data acquisition costs. The council also provides direction and oversight to ITS for the enhancement and maintenance of the Mississippi Geospatial Clearinghouse (MGC) and to the Mississippi Department of Environmental Quality's (DEQ) management, procurement, development, and maintenance of the Mississippi Digital Earth Model (MDEM). The MDEM is a digital land base computer model of the State of Mississippi and includes seven core data layers which provide the basis for a uniform GIS in each county.

ITS continues to work with the Mississippi Coordinating Council for Remote Sensing and GIS in the enhancement of the MGC and in the maintenance of GIS hardware and software procurement instruments for state agencies and local governing authorities. ITS continues to host the MGC, which serves as a resource for all state and local government entities, private citizens, as well as some private sector entities. The MGC enables the dissemination of information about Mississippi's Statewide GIS Coordination Program and provides access to metadata and geospatially-referenced data. Special channels of interest have been developed that provide information about each of the seven core data layers of MDEM.

Wireless Communications and Interoperability

Interoperability in wireless communications is generally defined as the ability to communicate on demand and in real time, across multiple agencies and local jurisdictions, exchanging voice and/or data when needed and as authorized. Currently, this ability does not exist in Mississippi on a statewide basis. This lack of communication is a nationwide problem highlighted by the tragedies of recent years, from the events of September 11 to the disasters of Hurricanes Katrina and Rita. The lack of a common communications system severely hampered the response to these events.

Senate Bill 2514, passed during the 2005 Legislative Session, created the Mississippi Wireless Communication Commission (WCC) and Legislative Advisory Board. The WCC, comprised of representatives of state and local

governmental entities, is charged with making recommendations and developing strategies for achieving interoperability to ensure effective communications services are available in emergencies. The legislation states that the WCC, in conjunction with ITS, shall have the sole responsibility to promulgate rules and regulations governing the operations of wireless communications systems. The WCC and its Advisory Board are working to develop a plan for statewide wireless communications, including voice and data.

In March 2006, ITS issued RFP 3429 on behalf of the WCC for the acquisition and three-phase deployment of a statewide, public-safety grade, seamless roaming, digital, trunked land mobile radio system. The Mississippi Wireless Information Network (MSWIN) system will be designed to accommodate state agencies, local governments, and other first responders. Motorola, Inc. was awarded the contract in the second quarter of 2007. MSWIN will be implemented in phases beginning in the southern part of the state and progressing northward. Initial site acquisition was completed and construction began in second quarter 2008. In another key wireless initiative, the WCC and ITS issued RFP 3489 for statewide cellular services and awarded the contract to Cellular South in the second quarter of 2007. The WCC intends for this contract to encourage a statewide build-out to deploy cellular voice and data services statewide. The majority of state agency cellular usage has been converted to the new contract, and significant numbers of county and municipal governments are taking advantage of the contract pricing structure.

Wireless communications and interoperability are ongoing, high cost, and highly complex initiatives impacted by the rapid expansion of available wireless solutions. The state and the WCC must consider and address short, middle, and long-term needs for achieving seamless wireless voice and data communications across all entities, disciplines, and jurisdictions. A common governing structure for managing and directing wireless projects and operations across state entities will improve the effectiveness of wireless communications and serve as the foundation for the interoperability needed to protect the health and safety of the citizens of our state. To address these and other strategic issues related to statewide wireless communications, ITS, at the request of the WCC, has developed a procurement instrument to obtain the services of one or more qualified wireless communication and systems integration vendors. The WCC is considering the services of one or more vendors on an as-needed basis to address such areas as project implementation, governance, and technology integration to achieve effective interoperability.

Platform Domain

Enterprise Physical Facility

Description

The State Data Center is operated by ITS and provides centralized information technology resources to agencies requiring shared information, enterprise computing resources, or any other centrally managed resources. The State Data Center contains:

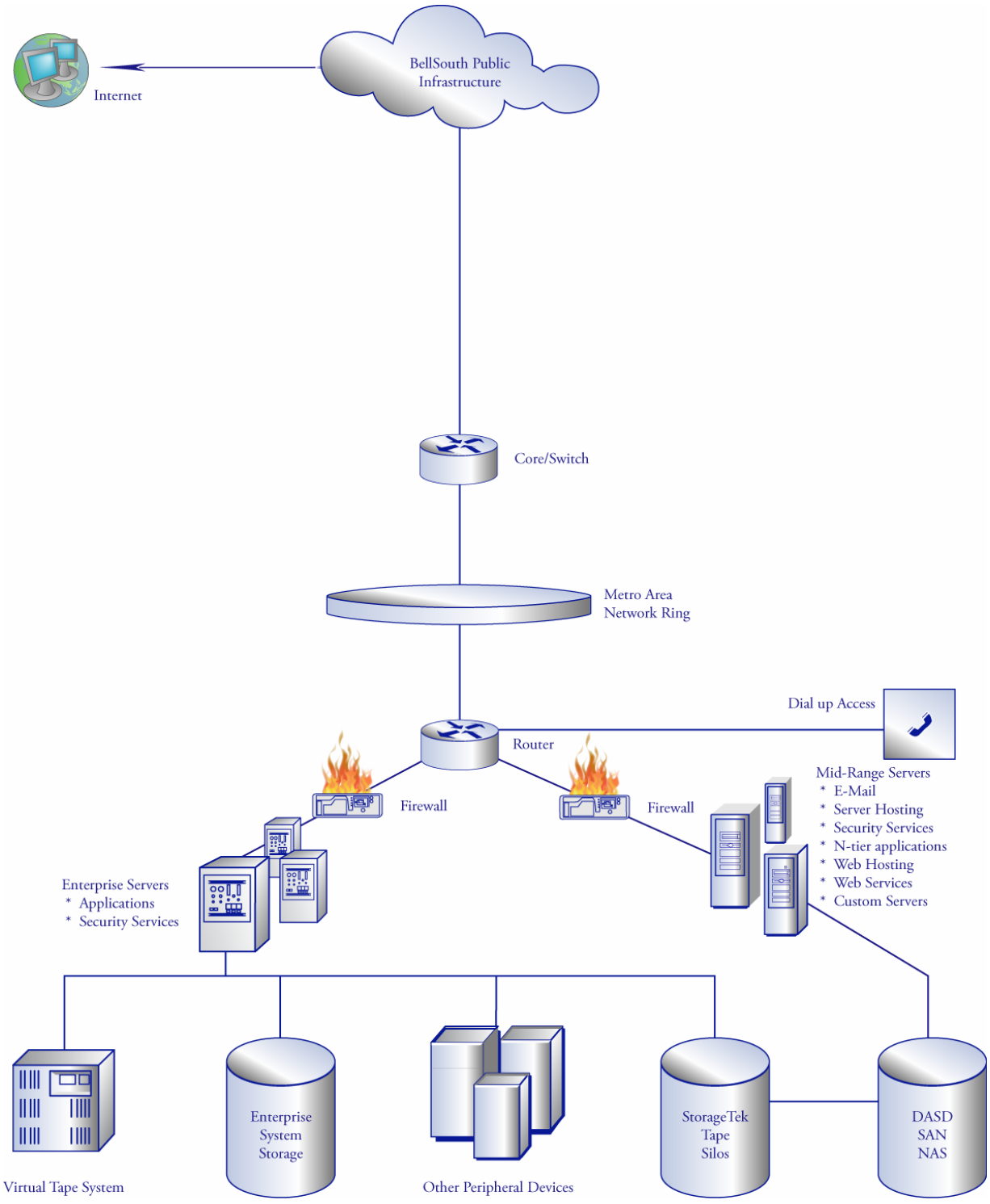
- ★ Core routers and switches supporting the state's Wide Area Network (WAN) and Metro Area Network (MAN) (along with network and security management components required for supporting the network)
- ★ Two mainframes and peripherals: one serving the Department of Human Services (MDHS) and the second shared by numerous other state agencies
- ★ Multi-tier/N-tier Infrastructure

- ★ Email servers
- ★ Mississippi Executive Resource and Library Information Network (MERLIN) warehouse server managed by the Department of Finance and Administration's (DFA) Mississippi Management and Reporting System (MMRS) division
- ★ Various other servers and peripherals

Physical Facilities Equipment

Included in the State Data Center are the following features that contribute to a secure and available physical environment:

- ★ Uninterruptible Power Supply (UPS) system, 350KVA generator
- ★ Electrical switches and panels
- ★ Chillers
- ★ Computer room floor units
- ★ Intelligent fire protection and alarm system
- ★ Raised floor system
- ★ Command and control console equipment
- ★ Security System with card access and security cameras



State Data Center Diagram

Proposed Projects

- ★ Construct new State Data Center facility

Benefits to the State

State agencies utilizing the State Data Center to house IT equipment will benefit from the following features:

- ★ Secure physical environment monitored and manned 7 days a week, 24-hours a day, including holidays
- ★ Fully redundant power source
- ★ Environmentally controlled space
- ★ Fully equipped fire suppression system with fire and water alarms

Enterprise Server

Description

The databases and programs for many traditional mainframe monolithic applications in state government are mission-critical and reside on an IBM mainframe. These applications include: the Department of Finance and Administration's Statewide Automated Accounting System (SAAS) and Statewide Payroll and Human Resource System (SPAHRS), the Tax Commission's Motor Vehicle Title and Registration System, and the Department of Health's Patient Information Management System (PIMS). Another IBM mainframe, belonging to The Mississippi Department of Human Services (MDHS), operates in parallel sysplex sharing mode with the other processors. Most of MDHS' large database applications run on this server including the Mississippi Applications Verification Reporting Information and Control System (MAVERICS), the Mississippi Enforcement and Tracking of Support System (METSS), the Jobs Automated Work System (JAWS), and the Mississippi Automated Child Welfare Information System (MACWIS).

Hardware and Software

Hardware

- 1–IBM 2096-S03 system (3 205 MIP processors, 24GB main storage, 28 ESCON Channels, and 6 FICON Channels)
- 1–IBM 2096-S02 system (2 210 MIP processors, 24GB main storage, 28 ESCON Channels, and 8 FICON Channels)
- 2–IFL (Linux only processor)
- 2–Zaap Processor (Java only processor)
- 2 Zip Processors (DB2 only)
- 1–Coupling facility
- 6–OSA-Express 1000Base-T Ethernet ports
- 6–OSA-Express Gigabit Ethernet LX
- 1–ESCON Director
- 1–IBM Enterprise Storage Server 800 disk subsystem
- 2–StorageTek Powderhorn library storage modules with 12 Timberline 9490 tape units and 10 Timberline 9840 tape units
- 1–IBM Virtual Tape System with 3494 Automated Tape System (64 virtual drives and 5 real 3590 Magstar drives)
- 1–3592 J70 Controller with 6- 3592 E05 drives
- 1–Router with 2 CIPs (Channel Interface Processors) to connect 2086s to Metro Area Network and to the State Wide Area Network
- 1–Xerox Nuvera 120 printer
- 4–3174 local controllers for console support

Software

- Operating system - Z/OS Release 1.7 (New name for OS/390 – MVS)—features include:
  - Communications server (TCP/IP, SNA)
  - Cryptographic services (digital signatures, secure sockets layer (SSL), etc.)
  - DFSMSdfp with DFSMShsm and DFSMSdss
  - DFSORT
  - IBM HTTP server
  - JES2
  - JESMaster
  - Language Environment
  - TSO/E and ISPF
  - Security server (LDAP and Firewall Technologies)
  - UNIX system services
    - Z/VM 5.3
  - SUSE LINUX 10
  - Databases

- ADABAS
- DB2
- Transaction processing
- CICS Transaction Server
- WebSphere Application Server
- Programming languages
- Natural
- COBOL for MVS
- High Level Assembler
- C/C++
- Java
- SAS
- CA-EasyTrieve
- System management and monitoring products
- CA-TLMS
- CA-7
- CA-11
- CA-View
- CA-Deliver
- CA-OPS
- CA-SYSVIEW monitoring tools (MVS, CICS)
- CA-NetMaster for monitoring TCP/IP
- CA-Vantage
- CA-Crews
- CA-MasterCat
- VPS for printer management

★ Programmer productivity tools
- CA-Optimizer
- File-AID
- Xpediter (TSO, CICS)
- Natural Construct

★ Other Tools
- Websphere Process Server
- Websphere Portal Bundle

Services Provided

- ★ Technical expertise in information technology
- ★ Computing power, physical facilities, and data storage capacity to support agencies' software applications
- ★ A secure environment for the data that ensures its continual availability
- ★ 24-hours a day, 7 days a week operation with 24-hour on-call technical support
- ★ A Help Desk that routes calls to the person most capable of providing the necessary assistance
- ★ Support for approximately 100 system software products
- ★ Acquisition and implementation of systems software products requested by state agencies
- ★ Assistance with the installation of application systems
- ★ Resolution of all problems related to systems software running at the State Data Center
- ★ Backup and recovery processes
- ★ Disaster recovery facilities and disaster recovery planning guidance
- ★ Large volume print capability

Proposed Projects

The following projects are planned for the Enterprise Server component:

- ★ Evaluate the use of the zSeries platform for mission-critical state applications.
- ★ Re-evaluate and restructure mainframe software contracts.
- ★ Investigate and pilot Linux applications on zSeries as solutions for some E-Business services.
- ★ Explore options for providing seamless Web access to legacy data residing in any enterprise server database or file. (This may require software upgrades, expansion of middleware services, or even the addition of software or hardware products.)
- ★ Upgrade zSeries operating system and support subsystems.
- ★ Implement current NAS Technology.
- ★ Explore the acquisition of a SAN Volume Controller (SVC) or other leading virtualized storage technology.

Benefits to the State

The Enterprise Server provides state entities with the following benefits:

- ★ Scalable, stable, available, and highly secure environment for application systems
- ★ Shared systems that produce long-term savings with economies of scale
- ★ Environment that supports both legacy applications and more recent E-Business applications, permitting integration on the same platform
- ★ Existing backup and recovery procedures

- Annually tested disaster recovery procedures
- Mature systems management facilities
- Mature development environment
- 24-hours a day, 7 days a week, 365 days a year operations
- Secure physical environment with dual power sources and controlled environment

Multi-tier (N-tier) Infrastructure

Description

High-performance microprocessors and high-speed networking technology have become available making it possible to deploy large applications, segmented by function, on the most cost-effective platform. Among the applications deployed in this multi-tier (N-tier) environment are:

- The Department of Human Services' GIS application
- The State Tax Commission's integrated tax system
- The Interwoven Document Management systems for several agencies
- The E-Government applications

While E-Government represents an umbrella term inclusive of web-based applications developed by ITS, other state government IT staff, or a third party vendor, it also covers enterprise infrastructure elements such as the state portal, payment engine, application development suites, document and content management services, integration middleware, directory services, access security, and the servers needed to support these services.

Hardware and Software

The following are included in the total configuration of the E-Government infrastructure:

Hardware

- Enterprise Server
- 12–IBM pSeries servers
  - Development environment
    - WebSEAL Proxy server
    - Application server
    - Middleware server
    - Database server
    - WebSphere Portal environment
    - GIS environment
  - Production environment
    - WebSEAL proxy server
    - Application server
    - Middleware server
    - Database server
    - WebSphere Portal environment
    - GIS environment
- Various single purpose Intel servers
  - Verity Ultraseek search engine server

- Microsoft SQL database servers
- 4-IBM BladeCenters with 8 one-way processors and 35 two-way processors
  - Lotus Notes Domino server
  - Rational repository server
  - Microsoft IIS server
  - Domain controller server
  - Interwoven Content Manager production and development servers
  - Interwoven Document Management server
  - Systems management servers
  - Mail Relay servers
  - Email servers
- 2-Partionable Intel servers running VMware
  - Various failover servers
  - Various test servers
  - Agency applications servers
  - Business continuity planning server
  - Email support
- Storage area network with approximately 28 Terabytes storage

Software

- AIX operating system
- Apache HTTP Server
- Crystal Decisions
- Domain name servers
- Enterprise performance monitoring products
  - CA-UniCenter Database Performance
  - CA-UniCenter MQ Services
  - CA-UniCenter Network and Systems Management
  - CA-UniCenter WebServices
  - CA-UniCenter WebSphere
  - CA-Management Portal
- EntireX Integration
- HACMP–failover
- Interwoven WorkSite Collaborative Document Management Suite
- Interwoven TeamSite Enterprise Content Management Suite
- IBM DB2
- IBM MQSeries and Host Access Transformation Services Information Brokering
- IBM/Tivoli Access Manager
- IBM WebSphere application development tools
- IBM WebSphere Application Server

- IBM WebSphere Portal
- Lotus Domino server
- LDAP
- Microsoft SQL
- Microsoft Windows server operating system(s)
- Rational/ClearCase/ClearQuest
- Verity Ultraseek search engine
- ESRI ArcSDE and ArcIMS GIS
- Strohl Systems LDPRS and BIA (Business Continuity and Business Impact Analysis Tools)

Services Provided

Currently, the following services are provided under the E-Government umbrella:

- Application failover
- Authentication/authorization
- Backup and recovery
- Change management services
- Controlled environment
- Database configuration and administration
- Disaster recovery planning/Business continuity planning
  - BIA- Business Impact Analysis
  - BCP- Business Continuity Plans
- Enterprise content management
- Enterprise performance monitoring/remote performance monitoring
  - Web applications (WebSphere, Windows, and Lotus Notes)
  - Hardware
  - Software (operating and system)
  - Databases
- Enterprise search services
- Enterprise systems monitoring services
- High speed Internet access information brokering LDAP directory services
- Operations support 24-hours a day, 7 days a week, 365 days a year
- Payment engine integrated with SAAS
- Physical security to protect access to the Infrastructure
- Portal hosting services
- Project management
- Secure data
- Server co-location
- Storage capacity–SAN (Storage Area Network)
- System integration services
- UPS and generator backup
- Web application development and hosting
  - Microsoft ASP.Net
  - Java

- Lotus Notes/Domino
- ★ Website development and hosting
- ★ Application service providing

Proposed Projects

The following projects are under consideration for the E-Government infrastructure:

- ★ Increasing the usage of Service Oriented Architecture (SOA) web services
- ★ Interactive Voice Response (IVR) WebSphere
- ★ Wireless applications
- ★ UNIX Server Virtualization
- ★ Virtualization of Open Systems Server and Storage Environment
- ★ Restructuring of the Storage Area Network (SAN) and addition of director class to SAN
- ★ Adding infrastructure to support GIS project

Benefits to the State

State agencies will benefit from the use of the E-Government infrastructure components in the following ways:

- ★ 24-hours a day, 7 days a week, 365 days a year Operations Services for monitoring of critical applications
- ★ Existing payment engine (accepts credit cards, debit cards, and e-checks) with full interfaces to SAAS and the Treasury
- ★ Backup and recovery
- ★ Charges, if applicable, based on usage and cost of doing business
- ★ Common infrastructure for services that support complex business processes spanning multiple applications
- ★ Fully functioning development environment
- ★ Fully secured environment
- ★ No duplication of hardware and software
- ★ Performance and availability

State GIS Infrastructure

Description

The Mississippi Geospatial Clearinghouse (MGC) provides access to a comprehensive spatial information warehouse of the Geographic Information Systems (GIS) resources of Mississippi for use by government, academia, and the private sector. The goal of the MGC (www.gis.ms.gov) is to make the application of spatial information technologies within the State of Mississippi more efficient by reducing the duplication of spatial data production and enhancing distribution through effective cooperation, standardization, communication, and coordination. ITS continues to work with the Mississippi Coordinating Council for Remote

Sensing and the Geographic Information Systems (GIS) in the enhancement of the Mississippi Geospatial Clearinghouse (MGC).

- 6–IBM HS21 (Dual-Core and Dual-Processor 3.0GHz 16GB RAM)
- SAN Storage per ITS Data Services Division Infrastructure
- Back up and Recover per ITS Data Services Division Infrastructure

Software

- 4–Operating system Windows 2003 Server 64 bit
  - ESRI 9.2 SP4 ArcGIS Server Advanced Enterprise Java (2-Development and Test Environments)
  - ESRI 9.2 SP4 ArcGIS IMS Java
  - 2- 2008 FME Server and Spatial Direct (1-Development Environment)
- 3–Operating system Red Hat Linux ES 64 bit
  - IBM Websphere Application and HTTP Server Java version 6.1
  - 2- 2008 FME Queue Server (1-Development Environment)
  - ESRI 9.2 SP4 ArcGIS Server Java Web ADF (2-Development and Test Environments)
- Operating system Red Hat Linux ES 32 bit
  - IBM DB2 version 9.0
- ESRI 9.2 SP4 ArcGIS SDE1–Operating system Windows 2003 Server 64 bit
  - VMWare hosting Development and Test Environments

Services Provided

- GIS Professional/Strategic Services and Consulting, which allows agencies to have access to technical expertise in GIS information technology
- Computing power, physical facilities, and data storage capacity to support agencies' GIS software applications
- A secure environment for the data that ensures its continual availability
- A Help Desk that routes calls to the person most capable of providing the necessary assistance
- Express Product Lists (EPL) for GIS hardware and GIS software for acquisition and implementation of systems software products requested by state agencies
- GIS Application design and hosting
- GIS Database design and hosting
- GIS Web Map Services
- GIS Data and application Backup and Recovery

Proposed Projects and Activities

- Continue to evaluate and enhance the capabilities of the MGC. The goal is to continue to be the leader in GIS hosting and delivery and to continue striving to utilize the latest GIS technology advancements.
- Continue to host and support the GIS efforts at MDHS.
- Continue to host and support the GIS efforts at MDA.

- ★ Continue to support the GIS efforts on the joint project at MEMA and MS Fusion Center.
- ★ Continue to support and host GIS efforts at MDWFP.
- ★ Continue to provide internal GIS services and support to internal operations within ITS.
- ★ Continue to extend the invitation to other state entities and local governments to use and participate in our GIS infrastructure and GIS technology, thereby allowing them to benefit from the shared resources housed and maintained in the State Data Center.

Benefits to the State

The GIS Enterprise Server provides state entities and local governing authorities with the following benefits:

- ★ The integration of GIS technology into business processes
- ★ Cost sharing for the implementing of the hardware, software and technical staff to support the complex architecture that produce long-term savings because of economies of scale
- ★ A scalable, stable, readily available, and highly secure environment for application systems
- ★ Existing backup and recovery procedures plus annual testing of disaster recovery procedures
- ★ Mature systems management facilities
- ★ A secure physical environment with dual power sources and controlled environment
- ★ The availability of trained technical staff for future plans and designs

Enterprise Messaging Services

Description

Enterprise Messaging Services (EMS) can have different meanings in different environments. Within the State Date Center's environment, it is the delivery and receipt of multiple forms of electronic messages. ITS provides an EMS infrastructure composed of hardware and software that will provide secure messaging services to state entities and local governing authorities, some optional and some not.

Hardware and Software

Hardware

- 2–Sun 280R servers
  - Outside mail relay server
  - Outside virus detection server
  - TLS encryption server
- 3–Sun V240 servers
  - Inside mail relay server
  - Inside virus detection server
  - Inside Spam detection server
  - TLS encryption server
- IBM Blade Server (Scalix)
  - Email
  - Calendaring
  - Notify services (PIM)
- 1–IBM Blade server relay
- 1–Fallback server relay
- IBM Fast T SAN
  - Message store

Software

- Sun Solaris OS
- Sendmail
- TLS Encryption
- Sophos Pure Message
- Notify Link
- Microsoft Exchange
- Scalix

Services Provided

ITS currently provides the following services under the EMS umbrella:

- Relaying of mail
- Virus scanning of all incoming mail
- Spam filtering
- Hosting of email
- Personal Information Management
- Calendaring
- Mail and Calendar Syncing
- Spam filtering of all incoming mail

Proposed Projects

- Instant Messaging
- ITS Sponsored ListServ

Benefits to the State

State agencies will benefit from the use of the EMS infrastructure in the following ways:

- ★ 24-hours a day, 7 days a week, 365 days a year operations
- ★ Redundant Servers
- ★ SAN message store allowing large mail boxes
- ★ Web access to mail and calendar
- ★ Secure environment
- ★ Backup and recovery

Network Domain- Voice

Statewide Voice Communications Network

Description

Statewide voice communications is provided for state entities and local governing authorities within the Capitol Complex, the greater Jackson area, and across the state though a variety of communications services. In late 2005, AT&T was awarded a new long-term contract to facilitate the state's communications network. Access to the Public Switched Telephone Network (PSTN) for local and long distance calling is provided through premises-based PBX trunking, business lines, and Centrex services statewide.

Centrex is a central office based voice communications system that provides many of the features and functionalities of a Private Branch Exchange (PBX) or Key Telephone System (KTS) without large capital investments. Centrex services are currently available in Tupelo, Oxford, Columbus, Starkville, Greenwood, Meridian, Jackson, Hattiesburg, McComb, Gulfport, Senatobia, Laurel, Vicksburg, Pearl, Greenville, Grenada, Picayune, Natchez, Biloxi, Brookhaven, Hazlehurst, Tunica, New Albany, Corinth, and Batesville. In the near future, Centrex will be available in Philadelphia, Grenada, Cleveland, Brandon, Iuka, Hernando, Yazoo City, Newton, Kosciusko, Pontotoc, Holly Springs, Lucedale, Clarksdale, Waynesboro, Aberdeen, Canton, West Point, Morton, Madison, Wiggins, and Booneville.

Voice communications in the Capitol Complex is provided through a centrally managed S8700 Series Communications Server (PBX). This system operates in a networked environment via remote servers on site at the following locations: Department of Transportation; Department of Public Safety; Department of Environmental Quality; Department of Human Services; Department of Health; E&R Complex; the Sillers Building; the Woolfolk Building; Agriculture and Commerce; Secretary of State; Veteran's Home Purchasing Board; Gaming Commission; and the Department of Wildlife, Fisheries, and Parks. Nearly forty agencies have access to this system via this network.

Hardware and Software

Hardware

- ★ 2–Fully Redundant S8700 Series Communications Managers
- ★ 32–Expansion Port Nodes

- 1–Audix Voice Mail Server
- Peripheral servers providing administrative and support functions

Software

- Intuity Voice Messenger
- Centre Vu CTCV
- AVAYA's Integrated Management (AIM) Software Suite
- AT&T's ECAS/DCAS Telephone Management Software
- AT&T's CC-Connect Service Request Entry Software
- MySoft Telecommunications Management Software

Services Provided

- **Local Access**

  This voice communications service is provided through PBX trunking, Centrex, and business lines for remote office locations statewide.

- **Local and Long Distance Calling Service**

  This service provides access to local, intrastate, interstate, and international calling through the state's voice communications network.

- **Universal Authorization Codes**

  This management tool tracks and verifies long distance calling by assigning a unique authorization code to each state employee. Universal calling allows a person to place a long distance call from any state-managed phone statewide; a real benefit for state employees traveling to a remote office.

- **Toll Free Numbers**

  This service can be provided to an agency's customers to support agency business at a cost-effective rate.

- **Voice Mail**

  Voice mail efficiently manages telephone messages for state employees. Our voice mail service is provided through either AT&T's Memory Call service or through the state's Audix voice mail system for customers in the Capitol Complex.

- **Message Manager**

  This PC-based software application can enhance a Capitol Complex employee's use of the Audix Voice Mail System.

- **Call Center Applications**

  This service allows Capitol Complex customer service representatives to offer on-demand assistance to customers. Telecom Services assist agencies in managing high call volumes while reducing operating and maintenance costs.

- **Centre Vu Supervisor**

  This software license allows supervisors to produce various reports for measuring Call Center employee productivity.

- **Audio Conference Calling**

  Telecom Services maintains this service to ensure a cost-effective way to use audio conferencing services at an affordable contracted rate.

- **Web Conferencing**

  Telecom Services maintains this Internet based service in order to provide a cost effective way to conduct on-line meetings and training opportunities at an affordable contracted rate.

- **Detail Billing**

  Telecom Services provides a comprehensive monthly bill designed to assist agencies with managing their telecommunications charges through itemized call detail and inventory reporting at the individual user level.

Proposed Projects

The following projects are planned to enhance the state's voice communications infrastructure:

- Migrate the remaining Expansion Port Nodes (EPNs) serving agencies in the Capitol Complex from a time-division multiplexing (TDM) based architecture to a distributed IP based architecture. The migration will bring the PBX serving the Capitol Complex up to date with technology as well as integrate voice and data communications across the Capitol Complex's fiber infrastructure. This will provide an additional business continuity solution by creating redundant routes to the main communications processors. This project, which was begun in July 2007 and is currently underway, is scheduled to be completed in June 2009.
- Upgrade the Capitol Complex's host telephone processors with the latest hardware and software. The existing operating system was installed in early 2005. In order to have continued support per the terms of our maintenance agreement, we must upgrade this system with the latest server technology and software release.
- Continue to migrate the state's business line customers to Centrex services. This action takes advantage of the cheaper fixed rate for Centrex service statewide, which was obtained via RFP 4000 and is guaranteed until at least 2015. This migration will reduce state expenditures and improve the performance of the state voice network.
- Provide voice and data connectivity to the agencies relocating to the 666 & 620 North Street buildings through connectivity to the Capitol Complex fiber network.
- Continue to reduce the number of vendor bills paid by the state and those sent to our customers for telecommunications services. The consolidation of telecommunications bills will allow the state to reduce the administrative cost of processing these bills for payment and provide an

audit process to ensure the best possible rates. Further, the consolidated management of telecommunications services will also provide a more accurate inventory of facilities statewide

- ★ Continue to enhance the new Telecommunications Management System to include MPLS data network billing, electronic billing capabilities, and on-line order entry. In February 2007, ITS implemented a new Telecommunications Management System (TMS) to better manage the state's voice and data infrastructure. Voice communications was the first to migrate to the new system. Along with the inclusion of data network billing information, the system will be enhanced to provide customers with on-line service request capabilities through a shopping cart interface.

Benefits to the State

State agencies benefit from using the state's voice communications infrastructure in the following ways:

- ★ Superior telecommunications services to the Capitol Complex and across the state, including a manageable and cost-effective communications infrastructure
- ★ Centralized management of all telecommunications services
- ★ Consistent, reliable, and reasonable telecommunications services statewide
- ★ Itemized call detail and billing
- ★ 24-hours a day, 7 days a week, 365 days a year access to voice applications, services, and trouble reporting

Network Domain- Data Video

Statewide Data Communications Network

Description

In 1994 a major initiative for Mississippi educational institutions directed the state toward an alternative to the existing Digital Backbone Network. Under Senate Bills 3350 and 2945, funding was made available to the educational community for technology enhancements. With this technology initiative, K-12 schools, community colleges, universities, and public libraries began to plan for inter-networking solutions to provide real-time access to online informational databases. These solutions were designed to provide connectivity between the prospective locations, enabling them to share educational and administrative data and improve access to the Internet.

AT&T (formerly BellSouth) was awarded a contract in 1995 that established public Frame Relay infrastructure in these six locations across the state: Tupelo, Greenwood, Meridian, Jackson, Hattiesburg, and Gulfport. This contract also established public Frame Relay infrastructure for Mississippi's use in Memphis, Tenn. In 1998, AT&T was awarded a new contract for Frame Relay and ATM services.

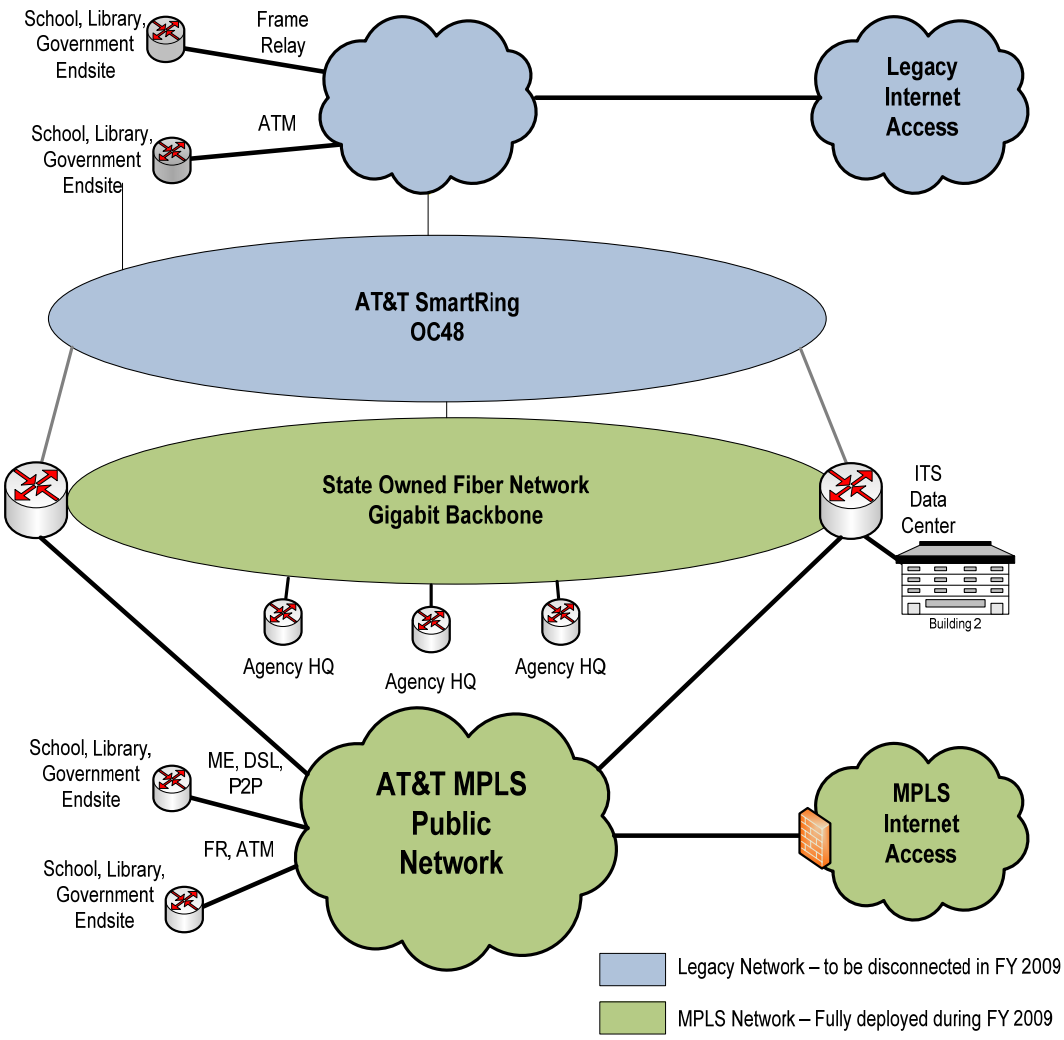
In 2005, AT&T was awarded the new contract for telecommunication services that included the data network products and services that support the existing Statewide Frame Relay/ATM Backbone Infrastructure as well as new technology utilizing Multi-Protocol Label Switching (MPLS) to facilitate secure, redundant, high performance wide area network connectivity. The new contract allows for all products and services to facilitate co-existence of all government and education

entities on the network, as well as the products and services needed to support new technologies and multiple options for connectivity, performance, and quality of service. Although BellSouth was purchased by AT&T in December of 2006, the contract remains intact for all contracted services.

As part of the implementation of MPLS infrastructure in Mississippi, AT&T is providing, at no additional cost to the state, firewall, intrusion prevention, and filtering services at the Internet access point to the state's network. These offerings will allow customers the flexibility to utilize these services yet avoid the cost associated with these services and products at each site they have on the network.

Some of the current applications on the statewide network are:

- ★ LAN/WAN interconnection
- ★ High speed image transfer
- ★ Host-to-host data transfers
- ★ Client/server applications
- ★ TN3270 applications
- ★ Statewide email
- ★ Supercomputing access
- ★ Remote systems management
- ★ Intranet web-based applications
- ★ Internet access, services, and web-based applications
- ★ Voice IP trunking
- ★ Voice over IP
- ★ H-323 IP-based Video
- ★ GIS
- ★ Telemedicine



Logical Wide Area Network Diagram

Metro Area Fiber Network

Description

The Metro Area Network (MAN) is an infrastructure component that supports high-speed data, voice, and video connectivity for all major state government buildings in the Capitol Complex (downtown Jackson area), the Education and Research (E&R) Complex, as well as buildings along the fiber path between the Capitol Complex and the E&R Complex. The infrastructure includes fiber connectivity within and between buildings plus the necessary routing and switching hardware. The resulting fiber network provides access to the State Data Center (enterprise servers, E-Government portal, and the State Voice Communications Platform), local and long distance voice network, and the Internet. The MAN is also a gateway to other agency sites statewide via the AT&T Multi-Protocol Label Switching (MPLS) network.

Hardware

- 2 Carrier class routers
- 2 Enterprise Layer 3 switches
- Redundant security infrastructure (Firewall, VPN, and IPS)
- Multiple workgroup switches for the State Data Center Network
- State-owned fiber connecting agencies in the MAN via Ethernet (from 100 to 1000 Mbps)
  - Department of Transportation HQ Building
  - Department of Transportation Lab Building
  - Walter Sillers Building
  - Department of Corrections Building
  - New Capitol Building
  - Woolfolk Building
  - Governor's Mansion fiber connecting Woolfolk Building
  - Department of Human Services Building
  - Department of Health Building
  - University of Miss. Medical Center
  - Department of Public Safety Building
  - Department of Agriculture and Commerce - Ag Museum Building
  - Workers Compensation Commission Building
  - Institutions of Higher Learning Building
  - Public Broadcasting Building
  - Library Commission Building
  - Department of Wildlife, Fisheries, and Parks Building
  - School for the Deaf/Blind
  - Heber Ladner Building (Secretary of State)
  - Secretary of State Building (North President St.)

- Department of Education Building
- Department of Archives and History Building
- Department of Agriculture and Commerce HQ Building
- Public Employees' Retirement System Building
- Ethics Commission Building
- Robert E. Lee Building
- Robert G. Clark, Jr. Building
- Department of Environmental Quality (Amite Street)
- Department of Environmental Quality (North State Street)
- 666 North Street Building
- 620 North Street Building

Services Provided

- TCP/IP Communications and Addressing
- Virtual Route Forwarding and Private VLANs
- H.323 Video Services
- SNA encapsulation
- Virtual Private Networks (LAN-to-LAN/Client)
- Domain Name Services (DNS)
- Webserver Resources (WWW)
- Mail Server Resources
- Intranet/Internet Security (Firewall, VPNs, and IPS)
- Private-to-Public Address Translation
- Dial-up Services
- Intrusion Prevention Systems
- Security Management and Reporting
- Network Monitoring, Management, and Reporting
- Internet Access and Related Services

Proposed Projects

- Construction of a new Data Center and Office building for ITS. This new facility will become the Education and Research Center node of the MAN. The current Data Center node of the MAN will continue to reside in the Capitol Complex. Planning for facility and resource upgrades, modifications, and moves are in motion as part of the new Data Center project.
- The current fiber network consists of a one gigabit backbone with alternate paths from each facility. During FY 2009, the first phase of a major upgrade to a ten gigabit backbone will be installed and implemented.

Benefits to the State

- Access to a managed, high bandwidth, fully redundant multi-protocol network connected to any state resource
- Access to a secure managed network, taking advantage of the technology investment implemented within the MAN

- ★ Lower overall costs due to the economies of scale of a shared infrastructure
- ★ Expanded functionality to facilitate disaster recovery and co-processing of information and services

Internet Access

Description

Internet access is provided via a contract with AT&T who serves as our current Internet Service Provider (ISP). AT&T utilizes services from Tier 1 network service providers Level 3 and UUNET. The current contract provides statewide Dedicated Internet Access via the AT&T Multi-Protocol Label Switching (MPLS) network.

Internet access has a large impact on the statewide network, primarily from the educational entities within the state. Whereas state agencies and other institutions use the network for communications with other state entities, in particular the State Data Center, as well as for Internet access, the educational entities use the network primarily to facilitate access to the Internet.

The primary mode of access to the Internet is through leased circuits connecting to the AT&T MPLS network. However, there are other access points including broadband, dial-up, and the Metro Area Network (MAN) in Jackson.

Configuration

Access to the Internet for all state entities is currently provided over the MPLS network with an aggregate capacity of 2.2 Gigabits provisioned for the State of Mississippi.

Services Provided

Listed below are the services offered by ITS and/or AT&T associated with Internet access. State entities and local governing authorities can take advantage of these services to provide access to their Internet users, or they may elect to configure their own Internet servers that will reside on the MAN or the MPLS network.

- ★ Email
- ★ Web services including www.ms.gov
- ★ Domain Name Services (DNS)
- ★ Security Services, including firewalls, authentication servers, VPNs, and IPS
- ★ Internet mail relay, virus protection, and SPAM filtering
- ★ Content filtering, management, and reporting

Agencies not connected to the MAN or the AT&T MPLS network, which need Internet access, may find it more economical to obtain services from a local Internet Service Provider (ISP). Agencies that want to pursue this alternative may

be able to acquire these services through a state contract. **All requests for these services must be directed to ITS**. If an alternate ISP is acquired, access to state resources through the Internet must be obtained utilizing a Virtual Private Network (VPN).

Proposed Projects

- ★ Increase access to the Internet to 2.5 Gbps
- ★ Complete the migration of customers to the MPLS network and Internet access
- ★ Expand the use of new security services bundled with MPLS based Internet access

Benefits to the State

- ★ A very high-speed, dedicated access to the Internet (The limiting factor is normally the local access circuit.)
- ★ A highly scalable solution for all participants
- ★ A low cost solution based on economies of scale and volume purchasing from the vendor
- ★ Security services (firewall, IPS, filtering) included with MPLS Internet access

Remote Access

Description

Remote access to the State Data Center and/or the state network is currently provided via a dial access server and Internet based Virtual Private Network (VPN) connections. ITS is migrating remote access services away from the dedicated dial access server to the VPN based model of remote access via dial-up, broadband, or dedicated Internet connections and VPNs.

AT&T is currently under contract to provide statewide Internet dial-up, broadband, and dedicated Internet access for those state government customers who have a requirement for remote access from mobile users, remote users, or other entities outside of the state network.

Security policies detail the requirements for VPNs when customers or vendors access state resources, whether from a private circuit or through the Internet. Authentication and authorization will be required through an authentication server.

Hardware and Software

- ★ Dial Access server providing analog dial capabilities
- ★ VPN Services for LAN-to-LAN and client VPNs
- ★ Unlimited client licenses to use VPN concentrator

Services Provided

- ★ 56Kbps or less remote access to State Data Center resources through dial-up facilities
- ★ Secure access using VPN technology to any state resource

Proposed Projects

- ★ Continue to migrate remote access services to VPN-based services in preparation for the elimination of direct dial remote access
- ★ Require all mainframe access via IPSec or state approved SSL VPNs

Benefits to the State

- ★ Low cost network access to State Data Center and state network resources
- ★ Secure remote access
- ★ State contracts for low cost solutions

Security Domain

Infrastructure Security

Description

Security issues and their resolution have become extremely complex. The use of Wide Area Networks and the Internet are creating great security risks, while at the same time, creating extensive opportunities. It is important to consider the security of all aspects of the Infrastructure, including unauthorized use of network applications, unauthorized access to certain data, and unauthorized access to physical components. The addition of E-Government applications has resulted in a more rigorous look at all aspects of infrastructure security. A comprehensive security policy document has been produced for users of the state's infrastructure. This document can be found by visiting the ITS homepage at www.its.ms.gov and selecting the Policies link on the far left of the page. This will take you to a page with a link to the State of Mississippi Enterprise Security Policy. This security policy emphasizes security related issues by ITS, other state entities, and the federal government.

Hardware and Software

Each infrastructure component has security elements as described below:

State Data Center Physical Facilities

- ★ Security cameras at strategic locations with all activity monitored and archived
- ★ Card Access Control System with biometric scanners as needed

Enterprise Server Component

- ★ Security server that includes LDAP server, network authentication service, and firewall technologies
- ★ Cryptographic services that include a system secure sockets layer (SSL) and the integrated cryptographic service facility
- ★ Protection for source modules, run-time modules, and data sources through the security server (RACF)

E-Government Infrastructure (State Portal)

- ★ Access Manager that includes proxy server, LDAP directory services, access control, and SSL
- ★ TLS encryption on mail relays

Network Security

- ★ Multiple firewall implementations
- ★ An Access Control Server that utilizes single-use, one-time passwords and two factor authorization to enforce access and authorization polices for networking components
- ★ An Intrusion Prevention System (IPS) that provides enterprise detection, reporting, and termination of unauthorized activity
- ★ VPN Concentrator/Clients for the implementation of IPSec Virtual Private Networks and qualified SSL to secure connectivity of untrusted third parties to state resources, as well as access to the state network by remote state employees.
- ★ Access control list at the switch and router level to protect agencies by stopping propagation of worms, viruses, and other threats
- ★ Security Management and Reporting System to monitor IPS events, firewall logs, and VPN concentrator logs for potential security threats

Services Provided

- ★ Protection of applications and data from unauthorized users
- ★ Network monitoring with long-term statistical reporting
- ★ Secure physical environment
- ★ Network address translation services
- ★ Preventing Internet users from accessing non-Internet related platforms
- ★ Preventing Internet users from accessing Internet related platforms with unauthorized IP protocols
- ★ LDAP services
- ★ Secure authentication services
- ★ Intrusion Prevention Services
- ★ The capability of using VPNs, SSL, cryptographic services, and digital signatures
- ★ Event correlation to determine network security issues

Proposed Projects

The following projects are planned to enhance Infrastructure Security:

- ★ Update the comprehensive security policies as needed
- ★ Enhance the Intrusion Prevention System to distribute the IPS functions and provide high performance redundant monitoring of inbound and outbound network traffic
- ★ Implement a statewide LDAP directory to aid in securing strategic, enterprise applications

- ★ Reconfigure the portal infrastructure to utilize the proxy function of Access Manager software
- ★ Expand the use of the access control function of Access Manager software for E-Government applications
- ★ Establish an Information Security Division

Benefits to the State

- ★ Secure environment covering physical facilities, network, and applications platforms, applications, and data
- ★ Participation in a shared environment that implements most of the features of a secure environment in a cost-effective manner with economies of scale
- ★ Access to a managed security infrastructure
- ★ Access to network reporting tools

Enterprise Management Domain

Infrastructure Disaster Recovery

Description

Every year more and more areas of state government become dependent on computerized data and on the networks that allow data to be distributed across the state. It has become critical to recover quickly from all forms of disaster that could affect computer hardware, software, data, and networks. In the event of a disaster, we must be able to bring significant infrastructure components back online and make them operational as soon as possible. The sophistication and complexity of today's technologies have increased the complexity of solutions for disaster recovery needs. ITS recognizes the need for a strong disaster recovery plan. Each year more infrastructure components are added to the list of hardware and software that is tested during our annual disaster recovery test. An infrastructure disaster recovery plan is updated annually and distributed to participants in the disaster recovery testing.

Configuration

ITS, MDHS, and Mississippi Department of Employment Security (MDES) currently have a contract with IBM Business Recovery Services to facilitate a recovery should a significant disaster strike. The coverage includes:

- ★ Six weeks of hot-site access
- ★ Six months of cold-site access
- ★ Mainframe capacity to handle both ITS customers and MDHS
- ★ Mainframe peripherals such as disk storage, tape drives, and printers
- ★ Open Systems capacity to handle mission-critical UNIX and Windows applications including email services
- ★ Routers, switches, and channel extenders to switch the Metro Area Network and Statewide Frame Relay/ATM Backbone Network to the hot-site
- ★ Reserve DS1s and Internet VPNs to connect to the hot-site

- ★ Mail processing facilities to print important documents such as checks and process for mailing for MDHS
- ★ Dial-up connectivity to hot-site as needed
- ★ Internet Access

Services Provided

Presently, ITS provides these disaster recovery services:

- ★ Adequate disaster recovery facilities for all mainframe applications
- ★ Adequate network access to the disaster recovery facilities for mainframe applications should a disaster strike the State Data Center
- ★ Disaster recovery for the networking infrastructure should a disaster strike any building in the Metro Area Network (MAN)
- ★ A disaster recovery plan that is distributed to customers and can be used as a guide for agency disaster recovery planning
- ★ Annual disaster recovery testing

Proposed Projects

The following projects are planned to improve ITS' ability to provide infrastructure disaster recovery:

- ★ Amend present business recovery services contract to update configuration and add equipment for recovering additional E-Government applications, email applications, and GIS infrastructure
- ★ Amend disaster recovery agreement with IBM Business Recovery Services to add individual agency servers as requested by customer agencies
- ★ Research options for creating state-owned disaster recovery facilities (A co-processing State Data Center would double as a disaster recovery site and would allow for a more comprehensive disaster recovery location. As an interim solution, remote tape vaulting and replication of critical data to remote disk storage subsystems will be considered.)

Benefits to the State

Value added disaster recovery services now provided in the following ways:

- ★ Extensive disaster recovery services
- ★ Annually tested disaster recovery plans
- ★ Periodically updated disaster recovery procedures which include new platforms and applications
- ★ Restoration of data processing for the State Data Center applications in 48-96 hours should a localized disaster occur

Infrastructure Administration

Description

An infrastructure that is as complicated as the State of Mississippi's requires a level of administration that is responsive, efficient, and effective. With much of the business of the state becoming increasingly dependent on the E-Government platform, Metro Area Fiber Network, and statewide networks, it is imperative that the business be supported by timely and well conceived plans for administering, monitoring, and managing the components.

The function of network management is carried out by a group of trained network technicians stationed in the central Network Operations Center (NOC). Network support is a twenty-four by seven operation that provides help desk support, technical troubleshooting, network performance monitoring and tuning, coordination of new site installations, and planning for major network expansions and technology migrations.

Currently, many different state entities are performing Level-1 troubleshooting for their respective customer bases. Level-1 support means handling those problems that are common, easily addressed, and for which handling procedures already exist. Level-2 support means handling those problems that are uncommon, complex, and often require a higher level of expertise.

- ★ The Mississippi Department of Education provides Level-1 support for the 152 school districts. As the K-12 schools migrate to Multi-Protocol Label Switching (MPLS), they will acquire fully managed services from AT&T.
- ★ The Library Commission provides Level-1 support for all public libraries. As the Library Commission migrates to MPLS, they will acquire fully managed services from AT&T.
- ★ The State Board for Community and Junior Colleges provides Level-1 support for all community college campuses.
- ★ The Department of Public Safety provides Level-1 support for criminal information center sites.
- ★ Mississippi Public Broadcasting and community college staffs currently staff and support the video network control center and provide help desk, conference and class scheduling, and other technical functions for the H.320 video network participants.
- ★ ITS provides Level-1 support for all other agencies and Level-2 support for the above support groups. (Larger agencies may provide Level-1 support for their applications and networks. ITS provides Level-2 support in these cases.)
- ★ ITS has implemented state-of-the-art NOC hardware and software and is moving toward consolidation of network management for state agencies.
- ★ The administration of the E-Government component and enterprise server component is also the responsibility of ITS personnel. Each of the infrastructure components has unique tools to aid in the proper management of the environment.

Hardware and Software

Most of the infrastructure components have administration and management elements included as software. These products for the enterprise server component and the E-Government component have already been listed. Because the network management environment is physically a distinct application environment, it is described below:

Hardware

- ★ Mixture of SUN and Microsoft NT Servers

Software

- ★ CA - Network Health
- ★ CA - Spectrum
- ★ Visio
- ★ CA-Service Desk

Services Provided

Infrastructure administration includes the services listed below:

- ★ Monitoring of all the components of the infrastructure, 24-hours a day, 7 days a week, 365 days a year
- ★ Collection and distribution of performance and usage data for all components
- ★ Collection of data for capacity planning and/or IT systems design
- ★ Billing and bill management
- ★ Helpdesk
- ★ Technical support on-call 24-hours a day, 7 days a week, 365 days a year

Proposed Projects

The following projects are planned to improve infrastructure administration:

- ★ Complete the implementation of new service desk software in conjunction with ITIL best practices
- ★ Integrate the telecommunication system and the new service desk

Benefits to the State

- ★ Support for all infrastructure services, 24-hours a day, 7 days a week, 365 days a year
- ★ Access to performance, capacity, and billing data as needed
- ★ A secure environment
- ★ Controlled test and production environments

Technical Research and Pilot Projects

Information Technology Infrastructure Library (ITIL)

ITIL is the state of the art in best management practices for Information Technology Infrastructure. The State Data Center is implementing ITIL best practices within the ITS infrastructure. ITS created a new service center as a single point of contact for all State Data Center users. All data services and telecom services requests or incidents are logged and managed by staff using CA-USD

(Computer Associates – Universal Service Desk) which is a premier product supporting ITIL implementation.

Automated problem management and change management are being implemented to provide quicker resolution of problems and more management control over the huge volume of changes implemented in a large data center.

The net result, as ITIL is implemented, is a more stable and dependable IT infrastructure that uses automation tools such as CA-USD and others to quickly allocate the correct resources needed to resolve issues, and to identify and anticipate the sources of the problems as quickly as possible. This, in turn, will prevent unnecessary interruptions of IT services.

Users of the State Data Center can call a service center analyst or access a web page to request assistance from the ITS Service Center. In addition to speeding up the resolution of issues, this information will be stored in a data base for further analysis. What is then learned from this analysis will be used to implement continuous service level improvements and formulate preventative measures to resolve issues before users are impacted.

Rural Health Care Pilot Program (RHCPP)

To significantly increase access to acute, primary, and preventive health care in rural America, the Federal Communications Commission (FCC) has dedicated over $417 million for the construction of sixty-nine statewide or regional broadband telehealth networks in forty-two states and three U.S. territories under the Rural Health Care Pilot Program (RHCPP). Broadband deployment is one of the FCC's top priorities, particularly in rural America. Nowhere is the need for broadband greater than in rural healthcare where isolated clinics can save lives by using advanced communications technology to tap into the expertise of modern urban medical centers.

The FCC's RHCPP will support the connection of more than 6,000 public and non-profit healthcare providers nationwide to broadband telehealth networks. The health care facilities participating in the pilot program include hospitals, clinics, universities and research centers, behavioral health sites, correctional facility clinics, and community health centers. Telehealth and telemedicine services provide patients in rural areas with access to critically needed medical specialists in a variety of practices, including cardiology, pediatrics, and radiology. In some instances the patients can access these specialists without leaving their homes or communities. Intensive care doctors and nurses can monitor critically ill patients around the clock. Video conferencing allows specialists and mental health professionals to care for patients in different rural locations, often hundreds of miles away.

Selected pilot projects are eligible for universal service funding to support up to eighty-five percent of the costs associated with the design, engineering and construction of their broadband health care networks. The pilot program's

requirements complement the Department of Health and Human Services' nationwide information technology initiatives that support the creation of a nationwide interoperable health information technology infrastructure to improve the quality of health care. These networks may connect to the public Internet or to one of the nation's dedicated Internet backbones, such as Internet2 or National LambdaRail.

Two Mississippi projects were selected as pilots by the RHCPP. The As One-Together for Health project, funded at $1,912,964 and developed by the Division of Medicaid, seeks to establish a new statewide non-dedicated telehealth network. This network will connect approximately 260 facilities through web-based conferencing tools running on commodity Internet and Internet2 connections. The second project that was selected was submitted by the University of Mississippi Medical Center and was funded at $3,918,319. The focus of this project is to upgrade the existing TelEmergency network and extend coverage to approximately ninety facilities (mostly rural) to provide telehealth services, web-based patient education, and a link to the university's knowledge base.

Project Homeland – Mississippi Common Operational Picture

Based on the enterprise investment in Geographic Information Systems (GIS), the State of Mississippi was selected as a pilot site for Project Homeland. ITS, having designed and implemented an enterprise GIS infrastructure designed to house the Mississippi Geospatial Clearinghouse (MGC), has facilitated the Project Homeland initiative. The purpose of the Mississippi pilot project is to provide broader access to static and dynamic geospatial information among federal, state, and local agencies by participating in a national homeland security service oriented architecture that promotes the use of Web services.

The Project Homeland Mississippi Pilot goals are to:

- Install state pilot GIS hardware, software, and data as necessary at Mississippi Emergency Management Agency (MEMA) offices in Jackson, Mississippi, utilizing the Department of Homeland Security (DHS) Geospatial Data Model.

- Provide state users (State Operations Center, Critical Infrastructure Protection Office, Fusion Center, and others) with the ability to view state data and information products via a customized user interface.

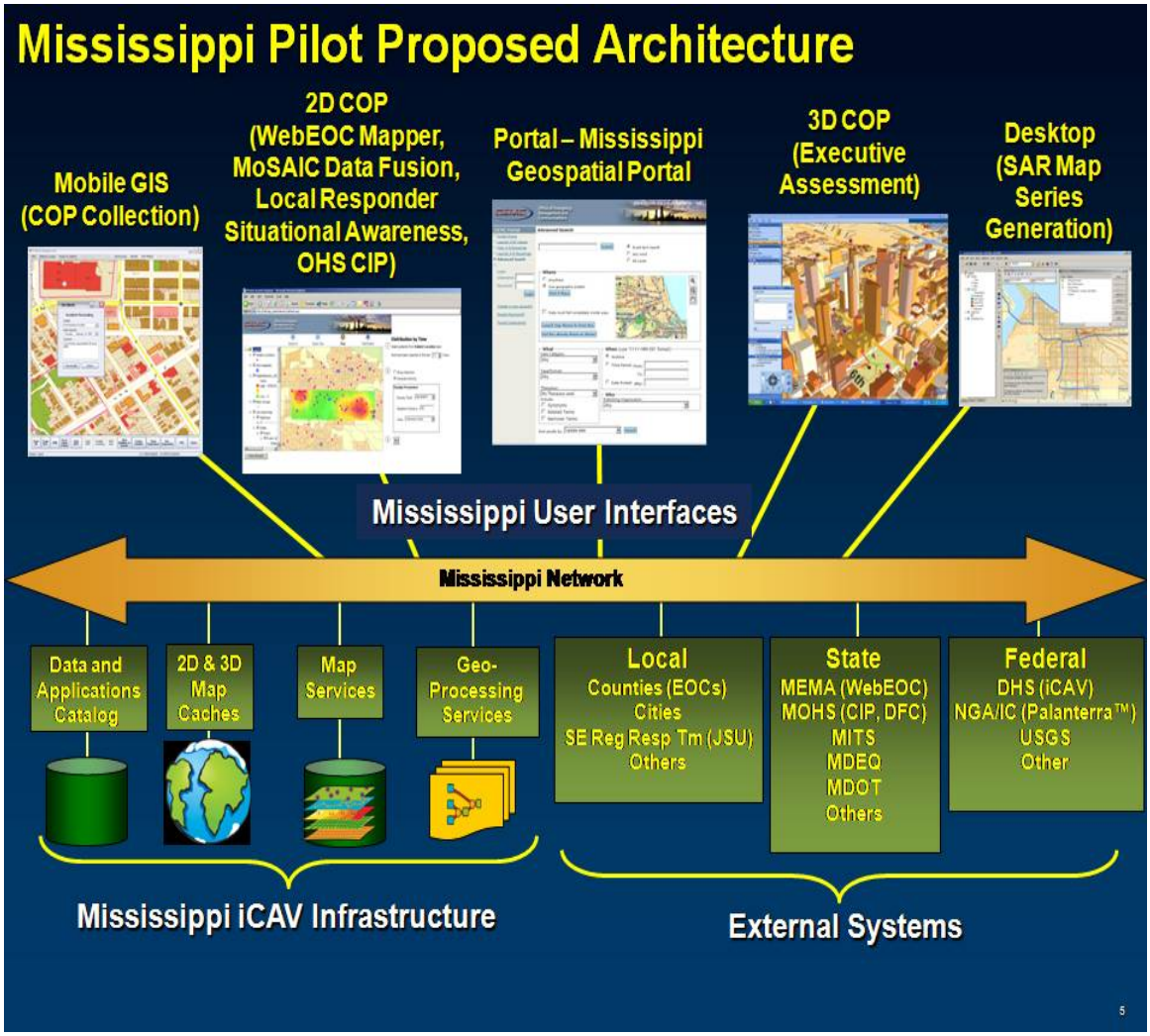
- Provide federal homeland security (HLS) community users with the ability to view/consume state data and information products via a viewer.

Project Homeland – Mississippi Pilot Strategic Objectives

With installation and testing to be completed in the third quarter of 2008, the success of the project is defined according to success criteria established by the National Geospatial-Intelligence Agency (NGA):

- Utilize agreed-upon HLS Data Model to identify GIS hardware, software, and data fielded to each state pilot.
- State users (state Emergency Operations Center [EOC], Critical Infrastructure Protection Office, Data Fusion Center) can view state data and information products via a state viewer.
- HLS community users can view state data and information products via a viewer.
- The pilot must demonstrate the accessibility of state pilot data by the Department of Homeland Security and the homeland security/homeland defense communities.

Project Homeland – Mississippi Pilot Proposed Architecture



ITS Contact Information

Robert G. Clark, Jr. Building, Suite 508
301 North Lamar Street
Jackson, MS 39201
(601) 359-1395
www.its.ms.gov
www.mississippi.gov

Executive Director
David Litchliter
(601) 359-1395
david.litchliter@its.ms.gov

Data Services
Mitchell Bounds
(601) 359-2638
mitchell.bounds@its.ms.gov

Education Services
Karen Newman
(601) 359-2629
karen.newman@its.ms.gov

Information Systems Services
Martha Pemberton
(601) 359-2743
martha.pemberton@its.ms.gov

Internal Services
Michele Blocker
(601) 359-5111
michele.blocker@its.ms.gov

Strategic Services
Claude Johnson
(601) 359-2748
claude.johnson@its.ms.gov

Telecom Services
Roger Graves
(601) 359-2892
roger.graves@its.ms.gov

Department of Information Technology Services

David L. Litchliter, Executive Director

Robert G. Clark, Jr. Building ● Suite 508
301 North Lamar Street
Jackson, Mississippi 39201-1495
Telephone (601) 359-1395
Fax (601) 354-6016
Website: www.its.ms.gov
State Portal: www.mississippi.gov